ORIGINAL ARTICLE

An audit of corneal abrasion management following the introduction of local guidelines in an accident and emergency department

S K Thyagarajan, V Sharma, S Austin, T Lasoye, P Hunter

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See end of article for authors' affiliations

Correspondence to: Dr S K Thyagarajan, Accident and Emergency Department, King's College Hospital, London, UK; srithyagarajan@doctors.org.uk

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Background and objectives: Corneal abrasions are a common presentation to accident and emergency (A&E) departments. Patients can be treated and discharged by A&E staff without the need for an ophthalmologist's attention; complicated cases, however, should be recognised and referred. Inexperience and limited training in ophthalmology may lead to suboptimal patient care and inappropriate use of ophthalmology outpatient clinics. Issues of poor documentation may also arise. The purpose of this audit was to assess the effect of guidelines on the management of corneal abrasion by A&E staff.

Methods: A retrospective case note audit was performed to assess current management of corneal abrasions. Guidelines for management of corneal abrasions were formulated following a literature search and collaboration between A&E and ophthalmology staff. A prospective case note audit was undertaken to assess management after introduction of the guidelines.

Results: A total of 51 cases were audited before the introduction of the guidelines and 57 cases after. Following the introduction of the guidelines documentation of visual acuity increased to 93% and specific enquiry into contact lens wear rose from 35.3% to 71.9%. A&E staff stopped giving out local anaesthetic eye drops. The follow up profile also improved; appropriate patient discharges increased by 40% whereas inappropriate referrals to eye clinic dropped by 75%. More patients were given abrasion advice (a 101% increase).

Conclusions: A&E staff members are capable of managing corneal abrasions if they are given guidance and some training. This audit identified shortcomings in current management and showed that guidelines can significantly improve clinical practice.

Corneal abrasions are a common ophthalmic problem presenting to accident and emergency departments (A&E).[1–3] A&E doctors and emergency nurse practitioners (ENPs) are expected to perform basic ophthalmic examination, provide treatment, and judge the need for specialist attention. For most cases of corneal abrasion, this primary episode of care is all that is needed. However, for A&E doctors and ENPs unfamiliar or untrained in ophthalmology, even the most straightforward cases may involve anxiety and mismanagement.[4]

As some aspects of corneal abrasion treatment remain controversial, and there are no national guidelines in UK, practice varies among individuals. The present audit aimed to:

- observe practice of care in terms of quality and variability
- formulate and implement a set of locally agreed ''good practice'' guidelines and standards suitable for A&E staff
- compare practice following introduction of the guidelines.

The study group involved in formulation of the guidelines included people from both the ophthalmology and emergency departments at King's College Hospital, London, UK.

METHODS

Formulation of the guidelines

A literature search was conducted, after which the guidelines were formulated based on discussion and collaboration between ophthalmology and A&E doctors. The key features of the history and examination of a corneal abrasion were easily identified, but the management and follow up sections needed more discussion.

There have not been any randomised controlled trials investigating healing of abrasions without antibiotic cover, but, traditionally, prophylaxis has always been used. The *British National Formulary* recommends a three to four times daily dosage of chloramphenicol ointment for treatment of infection. However, application of the ointment can result in blurring of vision. This makes the ointment unpopular for a midday dose. As most cases of abrasion are not infected and require only prophylaxis, and also, hopefully, to increase compliance, we adopted twice daily dosing to provide prophylactic antibiotic cover and lubrication. The fixed duration of five days was chosen to simplify instructions for the clinicians and the patients. It was agreed that the guidelines would be reviewed if the rates of infection subsequently increased. Usage of eye patches and mydriatics—for example, cyclopentolate—is controversial, but is thought to reduce pain. Recommendations were made to patch very painful abrasions for a limited period and to restrict cyclopentolate usage to severe photophobia. For patients at higher risk of poor prognosis: those with signs of infection, abrasion of their only functioning eye, recurrent corneal erosion, or with a history of contact lens wear, the guidelines recommended immediate referral or delayed ophthalmology attention.[5] Discharge was recommended for all other patients, but staff were to advise patients to return if they still had symptoms after 72 hours or if they developed any symptoms of infection.

Data collection and implementation of the guidelines

We used the emergency department database to identify patients diagnosed with a corneal abrasion between February and July 2005. Notes were audited using a standardised data

Box 1 Guidelines for corneal abrasion management in the A&E department

History—ask in addition to your usual history questions

- Document time, place and activity during injury
- Document the complaint: common abrasion symptoms: foreign body sensation/painful eye/watery eye and secondary blurred vision/photophobia
- Is it a recurrent problem? Did they wake up with it?
- Past ophthalmic history: Do they wear contact lenses? Any previous eye problems? Any eye surgery?
- Past medical history: arthritis? Atopy?
- Drugs: any drops?
- Allergies

Examination

- Must record visual acuities both eyes—use the patient's own glasses and then add the pinhole on top of that
- Must use the slit lamp or direct ophthalmoscope on high magnification—ask a senior if necessary
- Must examine both eyes
- Is there any purulent discharge from the eyes?
- Check under the lids
- Instil fluorescein dye (with topical local anaesthetic) and examine with cobalt blue light
- Draw a diagram of the eye with abrasion (the area of staining)
- Describe the position and size of abrasion. Is it in the centre or periphery of the cornea? Is it clear or is there associated infiltrate?
- Look at the anterior chamber looking for cells or pus

Management

- CHLORAMPHENICOL ointment BD to the affected eye for 5 days
- If they are very photophobic, put 1 drop of CYCLOPENTOLATE in the eye
- Advise ibuprofen or, if required, give co-dydramol
- Patch the eye for 4–6 hours if the abrasion is very painful, never patch an ulcer
- DON'T GIVE OUT TOPICAL ANAESTHETICS to take home
- Advise them to not wear contact lens for 2 weeks
- Give them the corneal abrasion leaflet. Advise them it may be painful for 2 days

Follow up

Most corneal abrasions can be discharged without any follow up. However some cases do need follow up

There is an infected ulcer (if you see any discharge, infiltrate in the abrasion or pus in the anterior chamber)—ring ophthalmology on-call for advice

Reasons for follow-up in ERS clinic:

- The abrasion is affecting the patient's ''only-seeing'' eye
- The patient gives a history of recurrent abrasion in the same eye
- The patient is a contact lens wearer

Ask the patient to return to A&E if they do not feel any improvement (vision or pain) in 72 hours or if the eye becomes sticky

If senior opinion is sought then please document who advised you and the advice that was given

collection sheet, which included potential aspects of corneal abrasion management and documentation. Case notes from the month of May were excluded to allow familiarisation with the guidelines.

The guidelines were introduced in May 2005; they were displayed in all clinical areas in the department including the eye examination room and were presented during several teaching sessions. Staff involved in this audit actively encouraged the use of the guidelines, which were divided into history, examination, treatment and follow up (box 1). It was made clear that senior help could always be sought if there were any concerns.

An anonymous questionnaire survey of A&E staff was carried out to determine the level of ophthalmic training, confidence with history taking, examination, management and follow up of corneal abrasion cases (appendix 1). The questionnaire also surveyed the perceived usefulness of the corneal abrasion guidelines. The survey was repeated two months after the introduction of the guidelines using a refined questionnaire.

RESULTS

Table 1 summarises case note data from before and after the introduction of the guidelines. A total of 123 cases of corneal abrasions were logged into the emergency department database. Notes for some cases were not located and additional cases were found when all non-coded eye notes were checked. Thus over a five month period a total of 108 cases were audited.

Before the introduction of the guidelines our department documented visual acuities in 86.3% of cases and ocular history, including the use of contact lenses, in 35.3%. Subsequent to guideline introduction, 93.0% had visual acuity documented, and 71.9% had a documented ocular history. The numbers of case notes containing diagrammatic and descriptive documentations of abrasions increased by 90% and 168%, respectively, after guideline introduction.

Documentation regarding antibiotic use rose from 58.8% to 92.8%. Local anaesthetics stopped being given as ''take home'' medication, and oral analgesia was recommended or given in 64.5% more cases. The percentage of appropriate discharges (that is, cases that did not meet any of the referral criteria) rose from 41.2% to 68.4%. Inappropriate referrals of patients who did not fit the guideline criteria or possess any other suitable reason for referral dropped from 39.2% to 8.8%. The number of patients sent to the eye clinic dropped from 49.0% to 12.3%. In addition, more patients were given advice on reasons to re-attend A&E (a 101% increase). Unfortunately, documentation of a presenting compliant and the use of fluorescein fell by 4.2% and 8.4%, respectively, after guideline implementation.

Nine senior house officers (SHOs) were surveyed concerning their confidence with regard to corneal abrasion management before the introduction of the guidelines. Most of them were not confident about using a slit lamp and had seen less than five corneal abrasion cases in the last three months; 77% were confident about the history taking component but only 22% were confident about the examination, and only 10% were confident about management and follow up. After guideline introduction six of the nine SHOs were surveyed again (three were on annual leave). All six had found the guidelines useful and reported confidence regarding history, management, and follow up components. Two were only a little confident with the examination component.

DISCUSSION

Our department, as many others nationwide, has agreed that corneal abrasions are to be treated in the A&E department by A&E doctors or ENPs. Complicated cases can be referred to

Table 1 Summary of case note audit

	Pre-guidelines notes (%) (n = 51)			Post-guidelines notes (%) (n = 51)		
Item	Yes	No	N/A	Yes	No	N/A
Examiner's name	84.3	15.7	0.0	77.2	22.8	0.0
Examiner profession	74.5	45.1	0.0	82.5	17.5	0.0
Time seen by examiner	88.2	11.8	0.0	84.2	15.8	0.0
Date seen by examiner	74.5	25.5	0.0	94.7	5.3	0.0
Presenting ophthalmic	96.1	3.9	0.0	91.2	8.8	0.0
Time, place and activity	80.4	19.6	0.0	100.0	0.0	0.0
Recurrent abrasion?	11.8	88.2	0.0	56.1	43.9	0.0
Ophthalmic history*	35.3	64.7	0.0	71.9	28.1	0.0
Medical history	82.4	17.6	0.0	94.7	5.3	0.0
Drug history	84.3	15.7	0.0	96.5	3.5	0.0
Allergies	82.4	17.6	0.0	91.2	8.8	0.0
Slit lamp used	74.5	25.5	0.0	94.7	5.3	0.0
Both eyes examined?	41.2	58.8	0.0	63.2	36.8	0.0
Visual acuity recorded	86.3	13.7	0.0	93.0	7.0	0.0
External adnexae	27.5	72.5	0.0	84.2	15.8	0.0
Lid eversion	27.5	72.5	0.0	40.4	59.6	0.0
Fluorescein instilled—Seidel?	84.3	15.7	0.0	77.2	22.8	0.0
Abrasion diagram	47.1	52.9	0.0	89.5	10.5	0.0
Abrasion documentation	31.4	68.6	0.0	84.2	15.8	0.0
Anterior chamber inflammation?	29.4	70.6	0.0	43.9	56.1	0.0
Diagnosis documented	62.7	37.3	0.0	91.2	10.5	0.0
Antibiotics given	58.8	41.2	0.0	98.2	1.8	0.0
Mydriatic instilled	2.0	98.0	0.0	47.4	52.6	0.0
NSAIDs: topical	0.0	100.0	0.0	1.8	98.2	0.0
NSAIDs: oral	3.9	96.1	0.0	68.4	31.6	0.0
Artifical tears	5.9	94.1	0.0	10.5	89.5	0.0
Eye patching	29.4	70.6	0.0	57.9	42.1	0.0
Topical anaesthetics given as TTA	9.8	90.2	0.0	0.0	100.0	0.0
Follow up	54.9	45.1	0.0	26.3	73.7	0.0
Sought senior opinion	9.8	90.2	0.0	8.8	91.2	0.0
Discharge appropriate?	41.2	3.9	45.1	68.4	5.3	59.6
Referral appropriate?	15.7	39.2	45.1	17.5	8.8	73.7
GP	5.9	94.1	0.0	14.0	86.0	0.0
Eye OPD	49.0	51.0	0.0	12.3	87.7	0.0
No follow up	45.1	54.9	0.0	73.7	26.3	0.0
Patient advised	39.2	60.8	0.0	78.9	21.1	0.0

*With specific enquiry into contact lens wear.
NSAID, non-steroidal anti-inflammatory drug. TTA, to take away.

an eye clinic or an on-call ophthalmologist, but most patients may be discharged. However, until recently there were no policies to aid the documentation, examination, management, or follow up of corneal abrasion cases. It was left to the individual doctor's or ENP's training, experience, and knowledge.

A&E SHOs receive little teaching on ophthalmic conditions, and unless they have previous ophthalmic or general practice training, their exposure to eye cases is sparse. A national telephone survey performed in 1997 revealed that inadequate basic ophthalmic training led to a lack of confidence among A&E SHOs with regard to management of eye conditions.[6] No studies have looked into the current level of ophthalmic training of A&E staff. ENPs and senior A&E staff are able to build-up experience, but there is usually a biannual turnover of SHOs. This means that most ''shop-floor'' staff have relatively little experience and confidence in ophthalmology but are expected to competently manage corneal abrasion.[7]

There is an abundance of published and online literature suggesting different regimens or focusing on specific aspects of corneal abrasion treatment.[8–13] Treatment remains much of an individual choice as to offering analgesia, patching eyes, administering cycloplegic drops, and arranging routine follow-up.

Clinical practice guidelines are statements that are intended to support medical decision making in well-defined clinical situations. Their purpose is to reduce the variability in medical practice and to improve quality. Our study found that guidelines were effective in improving clinical practice, and all staff found them to be helpful. Following implementation of our guidelines, the quality of documentation improved, incidents of poor practice reduced, and fewer inappropriate clinic referrals were made. The guidelines were also effective in improving levels of confidence in all aspects of corneal abrasion management. Nevertheless, we recognise that the management of these patients is still not optimal. Poorer performances in aspects such as the fluorescein test need to be addressed and improved rather than be dismissed as results of poor documentation. Efforts should be made on a regular basis to raise staff awareness of practice guidelines and audit outcomes to improve/maintain the quality of care provided.

Our confidence surveys showed that ENPs were more confident than SHOs before guideline introduction and a recent study also showed that they were more accurate when dealing with ophthalmic cases.[14] This is probably due to more dedicated training and repeated exposure. Although there may be arguments for eye cases to be exclusively seen by ENPs, this strategy would only work in a department which employed ENPs 24 hours a day. Also, this would deprive A&E doctors of all experience in ophthalmology. Training all staff in the use of the slit lamp and providing guidelines for a variety of ophthalmic cases may be a more practical solution. Greater collaboration between A&E and ophthalmology departments would certainly be required; however, the outcome of their efforts would benefit both patients and staff.

Authors' affiliations
S K Thyagarajan, S Austin, T Lasoye, Accident and Emergency Department, King's College Hospital, London, UK
V Sharma, P Hunter, Ophthalmology Department, King's College Hospital, London, UK

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APPENDIX 1
A&E STAFF CONFIDENCE SURVEY QUESTIONS

Designation …….

Please tick the relevant boxes

1. Have you had formal training and instruction in the management of corneal abrasions in A&E?
a. Some []
b. None []
c. Enough for me []

2. If your answer to 1 was a or c, who taught you?
a. Senior A&E staff []
b. Ophthalmic staff []
c. ENP []
d. Other []

3. Have you been taught how to use the slit lamp?
a. Yes []
b. No []

4. How confident do you feel in the use of the slit lamp?
a. Confident []
b. A little confident []
c. Not confident []

5. How many corneal abrasions have you seen in the last 3 months?
a. <5 []
b. 5–10 []
c.10–20 []
d.>20 []

6. How confident are you with dealing with a corneal abrasion case?
a. Confident []
b. A little confident []
c. Not confident []

7. If your answer to question 6 was b or c, what was the reason? (you may give more than one answer)
a. Not confident about diagnosis and management. []
b. Afraid you may miss something important. []
c. Not sure about what you should refer. []

8. Please rate your confidence for the following aspects of a corneal abrasion case:
The history taking: confident []
a little confident [] not confident []
The examination: confident []
a little confident [] not confident []
The management: confident []
a little confident [] not confident []
The follow up: confident []
a little confident [] not confident []

9. Do you refer corneal abrasions to the eye clinic?
a. Yes, always []
b. No, never []
c. Sometimes []

10. Do you speak to the ophthalmologist on-call about corneal abrasions?
a. Yes, always []
b. No, never []
c. Sometimes []
d. Yes, for specific reasons []

If your answer to question 10 was d. then please tell us your specific reasons for referral:

11. Do you know when to refer to abrasions to the eye clinic?
a. Yes, always []
b. No, never []
c. Sometimes []

12. Do you think guidelines would be helpful to you with the diagnosis, management and follow up of corneal abrasions?
a. Helpful []
b. Not helpful []
c. Won't make a difference []

13. Would you be happy to use guidelines on corneal abrasions if introduced into this department?
a. Yes []
b. No []
c. Not sure []

Thank you.